Supporting Information of
Sensitive and selective colorimetric sensing of Fe$^{3+}$ ion using $p$-amino salicylic acid dithiocarbamate functionalized gold nanoparticles

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Figure S1. Schematic representation for synthesis of DTC-PAS ligand and DTC-PAS-Au NPs assemblies.
Figure S2. FT IR spectra of (a) pure $p$-amino salicylic acid (b) DTC-PAS and (c) DTC-PAS-Au NPs.
Figure S3. $^1$H NMR spectra of (a) pure $p$-amino salicylic acid (b) DTC-PAS and (c) DTC-PAS-Au NPs.
**Figure S4** The relative extinction ratio of DTC-PAS-Au NPs at $A_{700\,\text{nm}}/A_{520\,\text{nm}}$ in the presence of Fe$^{3+}$ ion over other metal ions (Cd$^{2+}$, Co$^{2+}$, Cu$^{2+}$, Fe$^{2+}$, Fe$^{3+}$, Hg$^{2+}$, Mg$^{2+}$, Mn$^{2+}$, Ni$^{2+}$, Pb$^{2+}$, Zn$^{2+}$).
**Figure S5.** The extinction ratio of $A_{700\text{ nm}}/A_{520\text{ nm}}$ (a) DTC-PAS-Au NPs (b) DTC-PAS-Au NPs with different metal ions without Fe$^{3+}$ (c) DTC-PAS-Au NPs with Fe$^{3+}$ in presence of different metal ions and (d) DTC-PAS-Au NPs in presence of only Fe$^{3+}$. Inset picture show the photographic image of (a) capped Au NPs (b) capped Au NPs + different metal ions (c) capped Au NPs + different metal ions + Fe$^{3+}$ and (d) capped Au NPs + Fe$^{3+}$. 
Figure S6. UV-visible absorption spectra of DTC-PAS-Au NPs as colorimetric probes for analysis of Fe$^{3+}$ in (a) spiked blood serum and (b) spiked urine at 10, 50 and 100 µM of Fe$^{3+}$. 
Figure S7. Reproducibility of the present method for analysis of Fe$^{3+}$ (100 µM) at (a) inter-day spectra and (b) at intra-day spectra by using DTC-PAS-Au NPs as colorimetric probes.